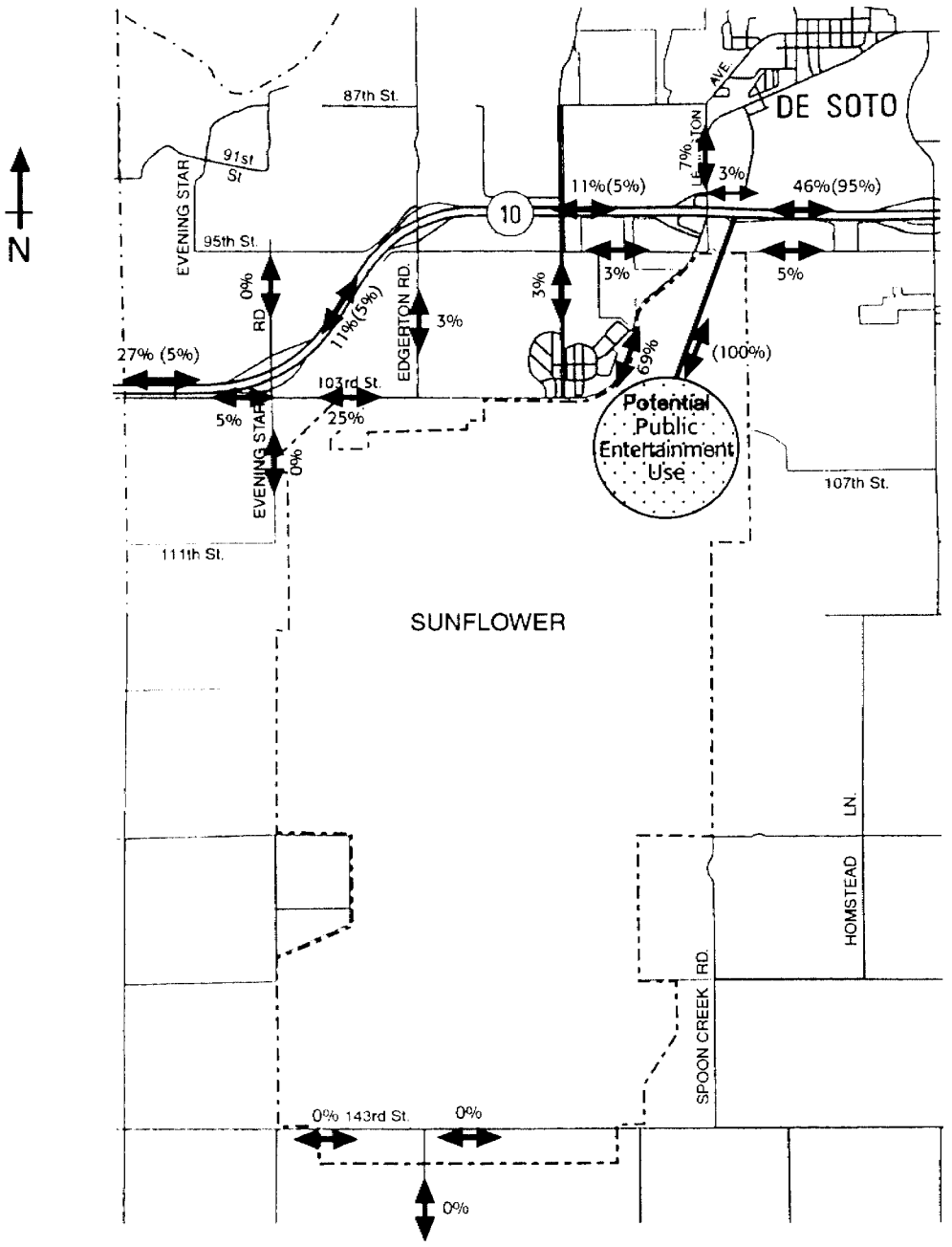
# 2004 DIRECTIONAL DISTRIBUTION OF TRAFFIC FOR SUNFLOWER SITE

**EXHIBIT IV-10**




XX – Directional Distribution of Traffic For All Land Uses Except Potential Public Entertainment Use

(XX) – Directional Distribution of Visitor Traffic For Potential Public Entertainment Use Only

Source: Dames & Moore/BRW, January 1999

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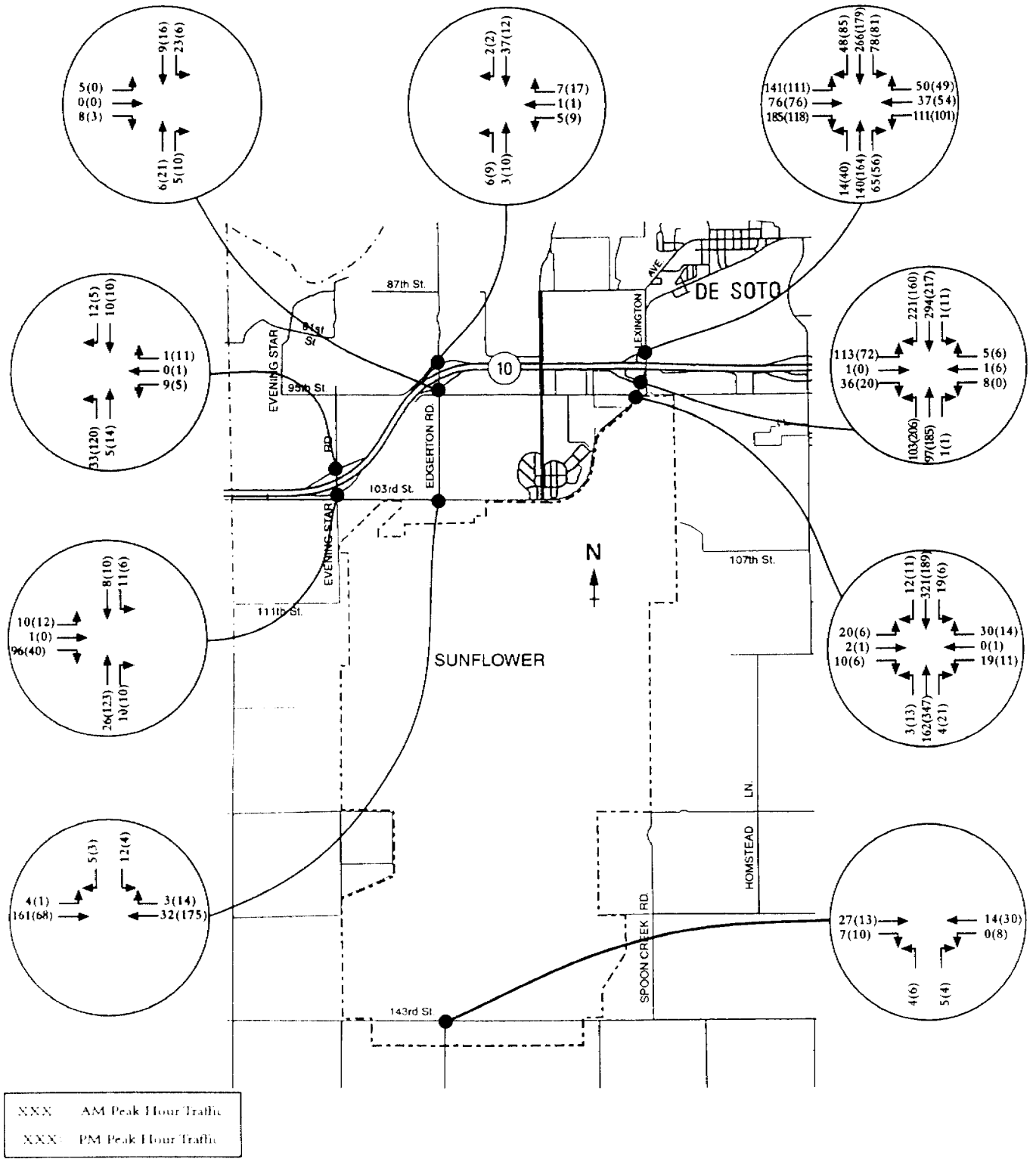
# LOWER INTENSITY DEVELOPMENT SCENARIO
# 2004 WEEKDAY AM AND PM PEAK HOUR TRAFFIC VOLUMES

**EXHIBIT IV-11**




**Source: Dames & Moore/BRW, January 1999**

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# EXHIBIT IV-12
# LEVEL OF SERVICE (LOS) ANALYSIS
# DISPOSAL ALTERNATIVE
# 2004 WEEKDAY AM AND PM PEAK HOUR TRAFFIC

| Location | Lower Intensity Dev. | | Higher Intensity Dev. | |
|---|---|---|---|---|
| | AM Peak Hour LOS | PM Peak Hour LOS | AM Peak Hour LOS | PM Peak Hour LOS |
| K-10 WB Ramps & Lexington Avenue: | | | | |
| EB approach | E | D | F | F |
| WB approach | D | C | F | F |
| NB left turn | A | A | A | A |
| SB left turn | A | A | A | A |
| K-10 EB Ramps & Lexington Avenue: | | | | |
| EB approach | C | C | F | F |
| WB approach | B | B | D | F |
| NB left turn | A | A | C | D |
| SB left turn | A | A | A | A |
| K-10 WB Ramp & Edgerton Road: | | | | |
| WB approach | A | A | A | A |
| NB left turn | A | A | A | A |
| K-10 EB Ramp & Edgerton Road: | | | | |
| EB approach | A | A | A | A |
| SB left turn | A | A | A | A |
| K-10 WB Ramp & Evening Star Road: | | | | |
| WB approach | A | A | B | B |
| NB left turn | A | A | A | A |
| K-10 EB Ramp & Evening Star Road: | | | | |
| EB approach | A | A | A | B |
| SB left turn | A | A | A | A |
| Lexington Avenue & 95th Street: | | | | |
| EB approach | B | B | C | C |
| WB approach | B | B | D | D |
| NB left turn | A | A | B | A |
| SB left turn | A | A | A | B |
| Edgerton Road & 103rd Street: | | | | |
| SB approach | A | A | B | B |
| EB left turn | A | A | A | A |
| Edgerton Road & 143rd Street: | | | | |
| NB approach | A | A | A | A |
| WB left turn | A | A | A | A |

Source: Dames & Moore/BRW, January, 1999.

*Higher Intensity Development Scenario*

For the higher intensity development scenario, it was assumed that a direct road access from K-10 to the theme park/public entertainment use would be provided. This new roadway would be located east of Lexington Avenue, would be a four-lane parkway, and would connect to K-10 via a new interchange. Only visitor traffic would use this new roadway; employee and service traffic to the public entertainment use would access the site from Lexington Avenue. The assumptions regarding this new roadway are based on information from Johnson County and from the *Environmental Assessment for the Construction and Operation of the Wonderful World of Oz, Phase I* (not a NEPA EA, but prepared merely to identify potential environmental issues).

For the higher intensity development scenario, the estimated Sunflower site-generated traffic was assigned to the roadway network using the directional distribution percentages shown in Exhibit IV-10. The Sunflower site-generated traffic was added to the traffic for the No-Action Alternative to produce the year 2004 traffic for the development scenario. The ADT for the nearby roadways is shown in Exhibit IV-5. The AM and PM peak hour traffic for the nine key intersections is shown in Exhibit IV-13.

To determine traffic operation changes at the nine key intersections, a level of service (LOS) analysis was performed for the development scenario using the AM and PM peak hour traffic volumes from Exhibit IV-13. The results of the LOS analysis are indicated in Exhibit IV-12.

A comparison of the LOS analysis for the No-Action Alternative to the LOS analysis for the higher intensity development scenario shows changes at six of the nine key intersections. At three of these intersections (the K-10 WB Ramp/Evening Star Road intersection, the K-10 EB Ramp/Evening Star Road intersection, and the Edgerton Road/103rd Street intersection), the LOS is expected to be better than LOS C, which means no congestion problems are anticipated at these intersections. Under the higher intensity development scenario, LOS C would be exceeded on the following intersection approaches:

K-10 WB Ramps/Lexington Avenue intersection
EB approach—AM and PM peak hour, LOS C to LOS F
WB approach—AM and PM peak hour, LOS C to LOS F

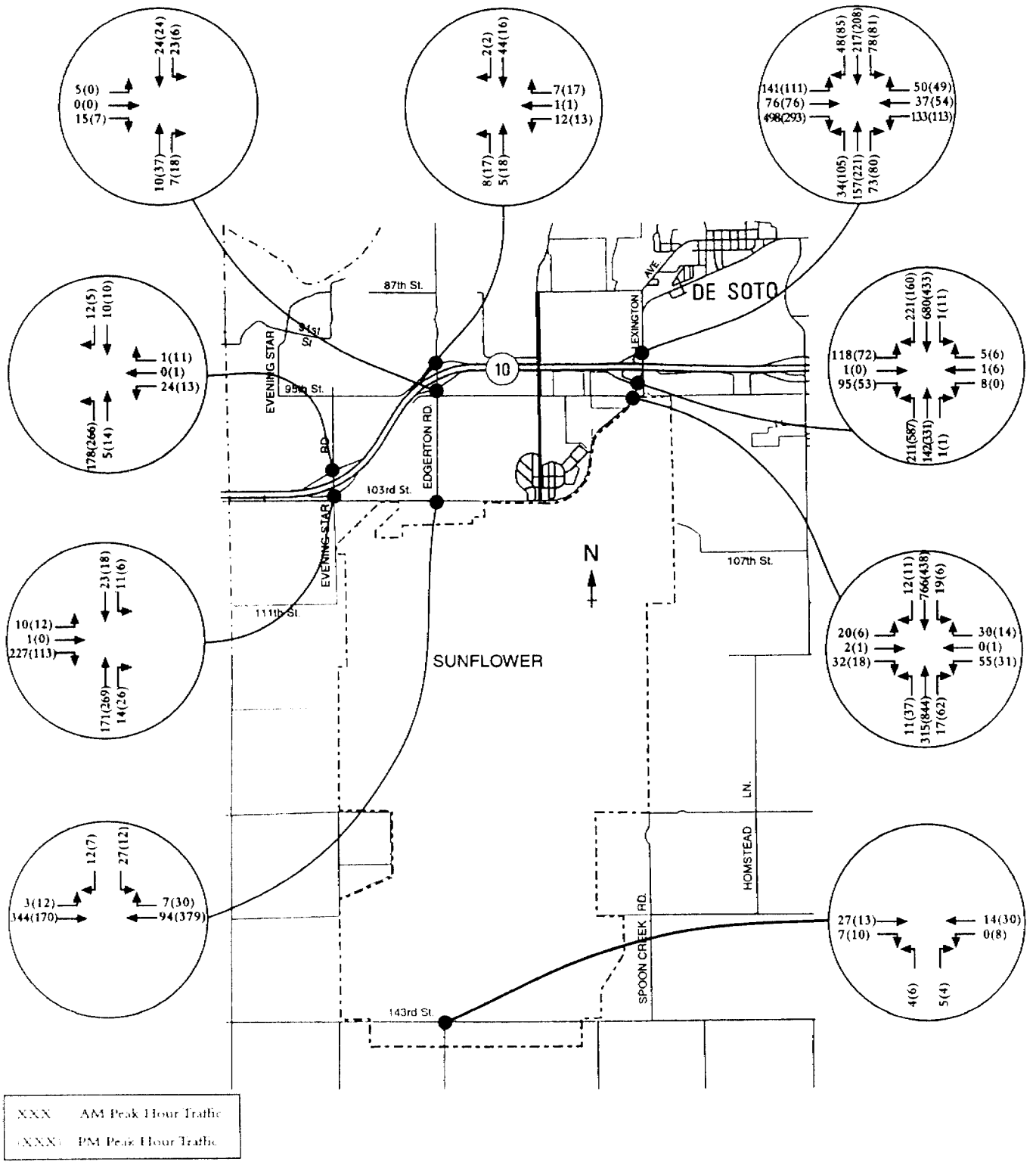
K-10 EB Ramps/Lexington Avenue intersection
EB approach—AM and PM peak hour, LOS B to LOS F
WB approach—AM peak hour, LOS A to LOS D
WB approach—PM peak hour, LOS A to LOS F
NB left turn—PM peak hour, LOS A to LOS D

Lexington Avenue/95th Street intersection
WB approach—AM and PM peak hour, LOS B to LOS D

Therefore, congestion is anticipated at the K-10 WB Ramps/Lexington Avenue intersection, K-10 EB Ramps/Lexington Avenue intersection, and Lexington Avenue/95th Street intersection under this development scenario, if no improvements are made to these intersections.

The ADT projected for the section of Lexington Avenue between 95th Street and Edgerton Road suggests that LOS C cannot be achieved on this two-lane roadway under the higher intensity development scenario. (The upper limit of LOS C operation on a two-lane roadway is approximately 11,000 veh/day.) Also, the 59,500 ADT forecast for K-10 east of Lexington Avenue is close to the upper limit of LOS C operation for a four-lane freeway (the upper limit of LOS C operation on a four-lane freeway is approximately 62,000 veh/day.).

# HIGHER INTENSITY DEVELOPMENT SCENARIO
# 2004 WEEKDAY AM AND PM PEAK HOUR TRAFFIC VOLUMES EXHIBIT IV-13




Source: Dames & Moore/BRW, January 1999

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- **Mitigation**

*Lower Intensity Development Scenario*

The traffic expected in 2004 is anticipated to cause congestion problems at the K-10 WB Ramps/Lexington Avenue intersection. This congestion should be reduced or avoided by providing a protected left turn lane on both the eastbound and westbound intersection approaches and by changing the traffic control at this intersection from two-way stop control to all-way stop control. With these improvements, this intersection would operate at LOS C under the lower intensity development scenario.

*Higher Intensity Development Scenario*

OEC has agreed by letter to KDHE dated August 30, 1999, to implement certain on-site and off-site transportation improvements to avoid potential adverse impacts on air quality. OEC also agreed that "these improvements....must be in place and operational as a condition precedent to the opening of the wonderful world of OZ theme park and resort. Traffic forecasts for 2004 indicate congestion at the K-10 WB Ramps/Lexington Avenue intersection, the K-10 EB Ramps/Lexington Avenue intersection, and the Lexington Avenue/95th Street intersection and on the section of Lexington Avenue/103rd Street from 95th Street to Edgerton Road. The congestion at the K-10 WB Ramps/Lexington Avenue intersection may be reduced or avoided by providing a protected left turn lane on both the eastbound and westbound intersection approaches, adding a free-right turn lane on the eastbound approach (the right turn lane should connect to Lexington Avenue south of the intersection and be controlled by a yield sign), and changing the intersection control from a two-way stop to an all-way stop. These improvements would allow the intersection to operate at LOS C for the Higher Intensity Development Scenario. An alternative improvement at this intersection would be to install a traffic signal system at the intersection. With a traffic signal installed at the intersection, LOS B can be achieved, and there would be no need to make any changes to the number of lanes on any approaches. The traffic volumes forecast for this intersection indicate the Peak Hour Signal Warrant (Warrant 11 from the Manual on Uniform Traffic Control Devices) would be met, and this warrant may be used to justify installing a traffic signal at this intersection.

The congestion at the K-10 EB Ramps/Lexington Avenue intersection may be reduced or avoided by installing a traffic signal system at this intersection. With this improvement, the intersection would operate at LOS B under the Higher Intensity Development Scenario. The projected traffic volumes for this intersection indicate the Peak Hour Signal Warrant would be met, and this warrant may be used to justify installing a traffic signal at this intersection.

The LOS D operation on the westbound approach of the Lexington Avenue/95th Street intersection is due to the difficulty that left turners from this approach have in finding an acceptable gap in the heavy traffic on Lexington Avenue. Since the number of left turners on the westbound intersection approach is only 55 in the AM peak hour and only 31 in the PM peak hour and since the projected traffic volumes at this intersection do not meet the engineering warrants for all-way stop control or traffic signal control, no measures are needed at this intersection.

The congestion on the section of Lexington Avenue/103rd Street from 95th Street to Edgerton Road may be reduced or avoided by reconstructing this roadway to provide at least a three-lane section (one travel lane in each direction and a center lane for two-way left turns). With this improvement, this section of highway will operate at LOS C. Johnson County has jurisdiction over this roadway, and the County may want to consider a higher design, such as a four-lane highway, to accommodate forecast traffic beyond the five-year design horizon used for this traffic analysis.

# 7. Meteorology

Primary factors affecting meteorological conditions are of a global scale and nature (non site-related). Examples of global factors are weather fronts or global atmospheric patterns that affect local weather conditions. It has been established in meteorological studies that city mesoclimates are markedly different from those over surrounding, more natural areas. City environments are usually warmer, drier, less windy, cloudier, and have a larger particulate burden than their rural counterparts. The differences between the urban and rural surroundings may affect local meteorological conditions. Examples of local factors are surface material (e.g., vegetation versus concrete), landscape shape and structure, heat sources, heat retention, and evapotransportation. Landscape shape and structure are terrain features that could be modified by building structures. Buildings can cause downwash effects, which result in the formation of recirculating air flows in the wake of structures. This building downwash effect may ultimately result in changes of local wind flow and velocity.

### a. No-Action Alternative

- **Probable Indirect and Cumulative Impacts**

Under the No-Action Alternative, minimal development would occur. The *Environmental Stabilization Program* (ESP) would result in demolition of the production facilities. The demolition activities would not significantly change the topography of the terrain and, therefore, would have no significant influence on wind flow and velocity at the site. Consequently, no meteorological impacts are expected under this alternative.

### b. Disposal Alternative

- **Probable Indirect and Cumulative Impacts**

Under the higher intensity development scenario, a relatively large land development (845 acres) is anticipated. However, the majority of land developed under this scenario would consist of a public entertainment complex, recreational areas (approximately 700 acres) and single-family residential (50 acres). Because of the nature of this type of development (i.e., a theme park, golf course, terraced lakes, resort hotel, service areas, vehicle park, retail, and single-family land use), many natural features would be preserved and the changes in the topography of the terrain would not be considered significant. Therefore, no impacts to the local meteorology are anticipated under this development scenario.

- **Mitigation**

No mitigation measures are necessary under either the lower or higher intensity development scenario.

# 8. Air Quality

### a. No-Action Alternative

- **Probable Indirect and Cumulative Impacts**

Under the No-Action Alternative, industrial use tenants and other facility activities would likely remain at the current level of operation or may diminish in activity. The currently implemented *Environmental Stabilization Program* (ESP) which involves demolition (burning) of the production facilities is expected to be completed within the next five years. Minimal development is likely to occur. Therefore, there would

be minimal increases in emissions from construction activities, environmental remediation, or mobile sources. The potential impacts from local emissions sources operating in the future will likely remain at the existing level, as described in Section III.B.8.

### b. Disposal Alternative

- **Probable Indirect and Cumulative Impacts**

There are no direct impacts to air quality as a result of disposal; rather, indirect and cumulative impacts may be associated with the reduction of industrial use and development consistent with the *Johnson County Conceptual Land Use Plan*. The Kansas City Metropolitan Area was classified as an ozone maintenance area in 1992, following several years of nonattainment for ozone. In order for the Kansas City Ozone Maintenance Area to remain in attainment, air emissions must fall within an emissions "budget" established for the Area. In 1995, the Kansas Department of Health and Environment (KDHE) published a revision to the Kansas City Air Quality Maintenance State Implementation Plan (SIP).[4] The revised SIP established motor vehicle budgets for emissions of VOCs and $NO_x$ for the years 2000 and 2010 (i.e., "horizon years") in the Kansas City Ozone Maintenance Area. These budgets were based on an analysis of emissions from the regional transportation system as a whole. The budgets were created using the actual emissions levels from 1990 (which are consistent with maintenance of the ozone standard), the projected emissions of a given year (i.e., 2000, 2010), the percentage of man-made emissions attributed to on-road motor vehicles, and horizon year on-road motor vehicle emissions inventories. Should actual emissions from the Kansas City area fail to conform with the VOC and $NO_x$ emissions budgets, the area could potentially lose federal funds for specific transportation projects.

According to the revised SIP, projected estimates of total VOC and $NO_x$ emissions from mobile sources in the Kansas City area in 2000 and 2010 are less than the budget level. Projected emissions in 2005 would also conform to this standard, as the emissions fall below the 2000 horizon year budget. Exhibit IV-14 presents the VOCs and $NO_x$ emissions budgets and projected emissions for the Kansas City Ozone Maintenance Area.

The differences between the budget and the projected emissions presented in Exhibit IV-14 suggest that there is some flexibility to allow for increases in VOCs and $NO_x$ emissions that may result from additional developments in the Kansas City Ozone Maintenance Area, such as the high density disposal alternative.

*Lower Intensity Development Scenario*

A relatively small land area (45 acres) is projected for potential development under this scenario. The redeveloped land is assumed to include a business park, limited highway commercial, KSU research space, and light industrial space.

Impacts from construction activities would be associated with future development. Emissions generated by heavy equipment during construction activities include emissions from fuel (diesel, gasoline) combustion and fugitive dust from the following sources: grading and relocation of soil (i.e., excavation); construction vehicles travelling on unpaved and paved roads to and from the construction sites; and wind erosion from construction materials stored in piles. Pollutants generated during construction activities include particulate matter (PM), nitrogen oxides ($NO_x$), carbon monoxide (CO), volatile organic compounds (VOCs), and

[4] Kansas Department of Health and Environment, Bureau of Air and Radiation. Kansas City Air Quality Maintenance State Implementation Plan Revision: Emissions Inventories and Motor Vehicle Emissions Budgets for the Kansas City Metropolitan Area. May, 1995.

# EXHIBIT IV-14
# VOC AND NOx EMISSIONS BUDGETS AND EMISSIONS PROJECTIONS FOR ON-ROAD MOBILE SOURCES IN THE KANSAS CITY OZONE MAINTENANCE AREA

| Emissions | Level of Projected Emissions by Year (kg/summer day) | | | | | |
|---|---|---|---|---|---|---|
| | 1990 | 1992 | 1995 | 2000 | 2005 | 2010 |
| Budgeted VOCs [a] | --- | --- | --- | 87,548 | --- | 82,885 |
| Projected VOCs [b] | 128,283 | 96,710 | 87,356 | 81,815 | 73,897 | 77,152 |
| Budgeted $NO_x$ [a] | --- | --- | --- | 119,889 | --- | 120,121 |
| Projected $NO_x$ [b] | 103,896 | 102,581 | 101,275 | 98,338 | 95,409 | 98,570 |

[a] Budgets assume normal growth in Kansas City Ozone Maintenance Area.
[b] 1990 and 1992 figures are actual emissions; all other years are projected emissions. Projected emissions were established in 1994.

Source: Kansas Department of Health and Environment, Bureau of Air and Radiation, Kansas City Ozone Maintenance State Implementation Plan Revision: Emissions Inventories and Motor Vehicle Emissions Budgets for the Kansas City Metropolitan Area, May 1995.

sulfur dioxide ($SO_2$). Pollutants emitted during construction activities would have short-term impacts and should not affect the overall air quality or attainment status of Johnson County or the Kansas City Ozone Maintenance Area.

Certain areas of Sunflower could be designated as Light Industrial Space (15 acres). To date, there is no information available regarding types and sizes of industrial emissions sources that would be in operation in this area. Typically, light manufacturing is associated with minor fabrications, industrial parks, warehouses, truck depots, and rail yards. In addition to new facility operations, the existing emissions sources at Sunflower, except the Koch Sulfur Products Company, would likely continue their operations during the 5-year period following disposal of Sunflower (see Section III.B.8).

Future development would be expected to result in an increase in traffic volumes. Section IV.D.6 (Transportation Systems) presents detailed information about projected increases in vehicular traffic (see Exhibit IV-15). Free flowing (moving) vehicles on roadways and idling vehicles in parking lots will generate emissions from fuel combustion and fugitive dust. Exhibit IV-15 presents mobile source emissions increases from additional vehicles as a result of the growth projected under the lower intensity development scenario. These county-wide emissions increases are calculated for vehicles travelling on Highway K-10. Highway K-10 is the closest major State Highway to Sunflower, running east-west approximately one mile north of the facility.

Emissions estimates were conducted for mobile sources on Highway K-10 in Johnson County, in year 2004, along a distance of 14 miles from the facility (approximately four miles west to the Johnson County boundary and approximately ten miles east to the intersection with Highway 435). For comparison purposes, Exhibit IV-15 presents the projected 2004 emissions estimates assuming normal growth (No-Action Alternative), and the existing emissions inventories for Johnson County and the Kansas City Ozone Maintenance Area, as presented in Section III.B.8, and the emissions budgets presented in Exhibit IV-14. The increase in traffic-related emissions in Johnson County under the lower intensity development scenario would be relatively small, with the greatest concentration anticipated to be in the vicinity of the development

# EXHIBIT IV-15
# COMPARISON OF MOBILE SOURCE EMISSIONS INCREASES FROM LOWER INTENSITY DEVELOPMENT TO NORMAL GROWTH AND EXISTING EMISSIONS LEVELS FOR JOHNSON COUNTY AND THE KANSAS CITY OZONE MAINTENANCE AREA

| Emissions Source | Emissions Inventory (Tons/Year) | | | | |
|---|---|---|---|---|---|
| | VOCs | $NO_x$ | CO | $SO_2$ | $PM_{10}$ |
| Additional Vehicles on Highway K-10 in Johnson County, in year 2004, as a Result of Lower Intensity Development [a] | 11 | 31 | 127 | 1 | 1 |
| Vehicles on Highway K-10 in Johnson County, in year 2004, under Normal Growth [b] | 262 | 481 | 1,948 | 22 | 19 |
| Existing Johnson County Emissions | 21,336 | 25,149 | 103,623 | 2,021 | 36,684 |
| Existing Emissions KC Air Quality Maintenance Area | 114,065 | 120,096 | 465,650 | 72,044 | 141,420 |
| % of emissions contributed in the year 2004 to Projected On-Road Emissions in the Kansas City ozone Maintenance Area [c] by additional vehicles on K-10 due to the Lower Intensity Development | 0.01% | 0.03% | -- | -- | -- |

[a] Assumed an average speed of 50 mph, distance of 14 miles, average daily traffic (ADT) west of the facility = 36,600, east = 36,200 and 365 days/year.

[b] Assumed an average speed of 50 mph, distance of 14 miles, ADT west of the facility = 35,100, east = 33,700 and 365 days/year.

[c] Projected on-road mobile source emissions in year 2005 are presented in Exhibit IV-14. Data are available for VOCs and $NO_x$ emissions.

Sources: (1) Emissions factors are based on EPA's MOBILE5a and PART5 (emissions factor models); (2) Total County-wide emissions are based on National Emissions Trends Viewer, CD, 1985-1995, Version 1.0, September 1996, EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC. Emissions provided in this table include county-wide emissions from all stationary and non-point emissions sources for 1995 (most recent available data); (3) U.S. EPA, Office of Air Quality Planning and Standards, AIRS Database, 1997.

area. The VOCs and $NO_x$ emissions from additional vehicles on Highway K-10 in Johnson County as a result of lower intensity development scenario, would be approximately 0.01% and 0.03%, respectively, of projected Kansas City Ozone Maintenance Area on-road mobile source emissions of VOCs, and $NO_x$. In addition, these mobile source emissions would be dispersed over a large geographic area. Therefore, no significant adverse impacts to the air quality of Johnson County or the Kansas City Ozone Maintenance Area are anticipated.

*Higher Intensity Development Scenario*

Under this scenario, there is a relatively large projected land development (845 acres). The redeveloped land would be the same as under the lower intensity development scenario, with additional potential for development of a public entertainment complex and public recreation area on approximately 700 acres, and additional single-family land development (50 acres).